

ALEKS[®] Course Syllabus

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| Course Name: Math 00022 - 010 SUM1 SUM16 | Course Code: UU49C-4H9U6 |
| ALEKS Course: Beginning Algebra | Instructor: Inst. Kellermann |
| Course Dates: Begin: 08/15/2014 End: 08/15/2015 | Course Content: 256 topics |
| Textbook: Miller/O'Neill/Hyde: Beginning Algebra, 4th Ed. (McGraw-Hill) - ALEKS 360 | |

Course Readiness (7 topics, no due date)

Course Readiness (4 topics)

- Multiplication of a decimal by a whole number
- Decimal multiplication: Problem type 1
- Word problem with decimal addition and multiplication
- Division of a decimal by a whole number

Course Readiness Supplementary Topics (3 topics)

- Word problem with subtraction of a whole number and a decimal: Regrouping with zeros
- Division of a decimal by a 2-digit decimal
- Word problem with decimal subtraction and division

Chapter 1 - The Set of Real Numbers (59 topics, no due date)

Section 1.1 (20 topics)

- Factors
- Prime numbers
- Prime factorization
- Least common multiple of 2 numbers
- Equivalent fractions
- Simplifying a fraction
- Addition or subtraction of fractions with different denominators
- Product of a fraction and a whole number: Problem type 1
- Fraction multiplication
- The reciprocal of a number
- Division involving a whole number and a fraction
- Fraction division
- Writing an improper fraction as a mixed number
- Writing a mixed number as an improper fraction
- Addition of mixed numbers with the same denominator and carry
- Subtraction of mixed numbers with the same denominator and borrowing
- Addition of mixed numbers with different denominators and carry
- Subtraction of mixed numbers with different denominators and borrowing
- Mixed number multiplication
- Mixed number division

Section 1.2 (7 topics)

- Fractional position on a number line
- Plotting rational numbers on a number line
- Using a common denominator to order fractions
- Square root of a perfect square
- Absolute value of a number
- Identifying numbers as integers or non-integers
- Identifying numbers as rational or irrational

Section 1.3 (12 topics*)

- Writing expressions using exponents
- Introduction to exponents
- Order of operations with whole numbers and grouping symbols
- Order of operations with whole numbers and exponents: Basic
- Order of operations with fractions: Problem type 1
- Order of operations with fractions: Problem type 2
- Perimeter of a square or a rectangle
- Area of a square or a rectangle
- Square root of a perfect square
- Writing a one-step expression for a real-world situation
- Translating a phrase into a two-step expression
- Square root of a rational perfect square

Section 1.4 (1 topic)

- Writing a signed number for a real-world situation

Section 1.5 (4 topics)

- Word problem with addition or subtraction of integers
- Signed fraction addition or subtraction: Basic
- Signed decimal addition and subtraction with 3 numbers
- Operations with absolute value: Problem type 2

Section 1.6 (8 topics)

- Signed fraction multiplication: Advanced
- Exponents and integers: Problem type 1
- Exponents and integers: Problem type 2
- Exponents and signed fractions
- Order of operations with integers
- Order of operations with integers and exponents
- Evaluating a linear expression: Integer multiplication with addition or subtraction
- Evaluating a quadratic expression: Integers

Section 1.7 (4 topics)

- Properties of real numbers
- Using distribution and combining like terms to simplify: Univariate
- Using distribution with double negation and combining like terms to simplify: Multivariate
- Combining like terms in a quadratic expression

Chapter 1 Supplementary Topics (4 topics)

- Word problem with common multiples
- Fractional part of a circle
- Multi-step word problem involving fractions and multiplication
- Signed fraction addition or subtraction: Advanced

(*) Some topics in this section are also covered in a previous section of this Objective. Topics are only counted once towards the total number of topics for this Objective.

Additional Topics Appendix (20 topics, no due date)

Section A.1 (8 topics)

- Converting a decimal to a proper fraction in simplest form: Advanced
- Converting a fraction to a terminating decimal: Advanced
- Converting a fraction to a repeating decimal: Advanced
- Converting between percentages and decimals
- Converting a percentage to a fraction in simplest form
- Converting a fraction to a percentage: Denominator of 20, 25, or 50
- Finding a percentage of a whole number without a calculator: Basic
- Writing a ratio as a percentage without a calculator

Section A.3 (7 topics)

- Perimeter of a polygon
- Perimeter of a square or a rectangle
- Area of a square or a rectangle
- Area of a triangle

- Circumference and area of a circle
- Finding supplementary and complementary angles
- Finding an angle measure of a triangle given two angles

Section A.4 (5 topics)

- U.S. Customary unit conversion with whole number values
- Metric distance conversion with whole number values
- Converting between metric and U.S. Customary unit systems
- Converting between temperatures in Fahrenheit and Celsius
- Converting between compound units: Basic

Chapter 2 - Linear Equations and Inequalities (59 topics, no due date)

Section 2.1 (8 topics)

- Additive property of equality with whole numbers
- Additive property of equality with decimals
- Additive property of equality with integers
- Multiplicative property of equality with whole numbers
- Multiplicative property of equality with integers
- Multiplicative property of equality with signed fractions
- Additive property of equality with a negative coefficient
- Translating a sentence into a one-step equation

Section 2.2 (7 topics)

- Using two steps to solve an equation with whole numbers
- Solving a two-step equation with integers
- Solving a linear equation with several occurrences of the variable: Variables on the same side and distribution
- Solving a linear equation with several occurrences of the variable: Variables on both sides and distribution
- Solving a linear equation with several occurrences of the variable: Variables on both sides and two distributions
- Solving a two-step equation with signed fractions
- Solving equations with zero, one, or infinitely many solutions

Section 2.3 (3 topics*)

- Solving a two-step equation with signed fractions
- Solving a linear equation with several occurrences of the variable: Variables on both sides and fractional coefficients
- Solving a linear equation with several occurrences of the variable: Fractional forms with binomial numerators

Section 2.4 (4 topics*)

- Writing a one-step expression for a real-world situation
- Translating a phrase into a two-step expression
- Translating a sentence into a one-step equation
- Solving a word problem with two unknowns using a linear equation

Section 2.5 (7 topics)

- Finding a percentage of a whole number without a calculator: Basic
- Applying the percent equation: Problem type 2
- Writing a ratio as a percentage without a calculator
- Finding the sale price without a calculator given the original price and percent discount
- Finding the original price given the sale price and percent discount
- Finding the percentage increase or decrease: Advanced
- Finding simple interest without a calculator

Section 2.6 (11 topics)

- Area of a triangle
- Circumference and area of a circle
- Solving for a variable in terms of other variables using addition or subtraction: Advanced
- Solving for a variable in terms of other variables using multiplication or division: Advanced
- Solving for a variable in terms of other variables using addition or subtraction with division
- Solving for a variable inside parentheses in terms of other variables
- Solving for a variable in terms of other variables in a linear equation with fractions
- Finding the side length of a rectangle given its perimeter or area
- Finding a side length given the perimeter and side lengths with variables
- Finding the perimeter or area of a rectangle given one of these values

- Solving equations involving vertical angles

Section 2.7 (4 topics)

- Solving a decimal word problem using a linear equation of the form $Ax + B = C$
- Solving a value mixture problem using a linear equation
- Solving a distance, rate, time problem using a linear equation
- Solving a percent mixture problem using a linear equation

Section 2.8 (11 topics)

- Translating a sentence by using an inequality symbol
- Graphing a linear inequality on the number line
- Translating a sentence into a compound inequality
- Graphing a compound inequality on the number line
- Set builder and interval notation
- Additive property of inequality with whole numbers
- Multiplicative property of inequality with integers
- Solving a two-step linear inequality: Problem type 1
- Solving a two-step linear inequality: Problem type 2
- Solving a linear inequality with multiple occurrences of the variable: Problem type 3
- Solving a compound linear inequality: Graph solution, basic

Chapter 2 Supplementary Topics (6 topics)

- Additive property of equality with fractions and mixed numbers
- Solving a fraction word problem using a linear equation of the form $Ax = B$
- Solving a decimal word problem using a linear equation with the variable on both sides
- Solving a fraction word problem using a linear equation with the variable on both sides
- Solving a word problem involving rates and time conversion
- Finding angle measures of a right or isosceles triangle given angles with variables

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Chapter 3 - Graphing Linear Equations in Two Variables (25 topics, no due date)

Section 3.1 (2 topics)

- Reading a point in the coordinate plane
- Plotting a point in the coordinate plane

Section 3.2 (10 topics)

- Identifying solutions to a linear equation in two variables
- Finding a solution to a linear equation in two variables
- Graphing a linear equation of the form $y = mx$
- Graphing a line given its equation in slope-intercept form: Integer slope
- Graphing a line given its equation in slope-intercept form: Fractional slope
- Graphing a line given its equation in standard form
- Graphing a vertical or horizontal line
- Finding x- and y-intercepts of a line given the equation: Advanced
- Graphing a line given its x- and y-intercepts
- Graphing a line by first finding its x- and y-intercepts

Section 3.3 (4 topics)

- Finding slope given the graph of a line on a grid
- Finding slope given two points on the line
- Finding the slope of horizontal and vertical lines
- Graphing a line through a given point with a given slope

Section 3.4 (5 topics)

- Finding the slope and y-intercept of a line given its equation in the form $y = mx + b$
- Finding the slope and y-intercept of a line given its equation in the form $Ax + By = C$
- Graphing a line by first finding its slope and y-intercept
- Writing an equation in slope-intercept form given the slope and a point
- Finding slopes of lines parallel and perpendicular to a line given in the form $Ax + By = C$

Section 3.5 (5 topics*)

- Writing an equation in slope-intercept form given the slope and a point
- Writing an equation of a line given the y-intercept and another point
- Writing the equation of the line through two given points
- Writing the equations of vertical and horizontal lines through a given point
- Writing equations of lines parallel and perpendicular to a given line through a point

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Chapter 4 - Systems of Linear Equations in Two Variables (9 topics, no due date)

Section 4.1 (3 topics)

- Identifying solutions to a system of linear equations
- Classifying systems of linear equations from graphs
- Graphically solving a system of linear equations

Section 4.2 (1 topic)

- Solving a system of linear equations using substitution

Section 4.3 (2 topics)

- Solving a system of linear equations using elimination with multiplication and addition
- Solving a 2x2 system of linear equations that is inconsistent or consistent dependent

Section 4.4 (3 topics)

- Solving a word problem involving a sum and another basic relationship using a system of linear equations
- Solving a value mixture problem using a system of linear equations
- Solving a distance, rate, time problem using a system of linear equations

Chapter 5 - Polynomials and Properties of Exponents (36 topics, no due date)

Section 5.1 (7 topics)

- Circumference and area of a circle
- Exponents and integers: Problem type 1
- Exponents and integers: Problem type 2
- Exponents and signed fractions
- Introduction to the product rule of exponents
- Product rule with positive exponents: Multivariate
- Quotient of expressions involving exponents

Section 5.2 (5 topics)

- Introduction to the power of a power rule of exponents
- Introduction to the power of a product rule of exponents
- Power rules with positive exponents: Multivariate products
- Power rules with positive exponents: Multivariate quotients
- Power and product rules with positive exponents

Section 5.3 (9 topics)

- Evaluating expressions with exponents of zero
- Evaluating an expression with a negative exponent: Positive fraction base
- Evaluating an expression with a negative exponent: Negative integer base
- Rewriting an algebraic expression without a negative exponent
- Product rule with negative exponents
- Quotient rule with negative exponents: Problem type 1
- Power of a power rule with negative exponents
- Power rules with negative exponents
- Power, product, and quotient rules with negative exponents

Section 5.4 (3 topics)

- Scientific notation with positive exponent
- Scientific notation with negative exponent
- Multiplying numbers written in scientific notation: Advanced

Section 5.5 (3 topics)

- Degree and leading coefficient of a univariate polynomial
- Degree of a multivariate polynomial
- Simplifying a sum or difference of three univariate polynomials

Section 5.6 (8 topics*)

- Product rule with positive exponents: Multivariate
- Multiplying a univariate polynomial by a monomial with a positive coefficient
- Multiplying a multivariate polynomial by a monomial
- Multiplying binomials with leading coefficients of 1
- Multiplying binomials in two variables
- Multiplying conjugate binomials: Univariate
- Squaring a binomial: Univariate
- Multiplication involving binomials and trinomials in two variables

Section 5.7 (2 topics)

- Dividing a polynomial by a monomial: Univariate
- Dividing a polynomial by a monomial: Multivariate

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Chapter 6 - Factoring Polynomials (24 topics, no due date)

Section 6.1 (8 topics)

- Factors
- Greatest common factor of 2 numbers
- Introduction to the GCF of two monomials
- Greatest common factor of two multivariate monomials
- Factoring out a monomial from a polynomial: Univariate
- Factoring out a monomial from a polynomial: Multivariate
- Factoring a univariate polynomial by grouping: Problem type 1
- Factoring a univariate polynomial by grouping: Problem type 2

Section 6.2 (1 topic)

- Factoring a quadratic with leading coefficient 1

Section 6.3 (4 topics)

- Factoring a quadratic with leading coefficient greater than 1: Problem type 1
- Factoring a quadratic with leading coefficient greater than 1: Problem type 2
- Factoring a quadratic in two variables with leading coefficient greater than 1
- Factoring a product of a quadratic trinomial and a monomial

Section 6.5 (6 topics)

- Factoring a perfect square trinomial with leading coefficient 1
- Factoring a perfect square trinomial with leading coefficient greater than 1
- Factoring a perfect square trinomial in two variables
- Factoring a difference of squares in one variable: Basic
- Factoring a difference of squares in one variable: Advanced
- Factoring a difference of squares in two variables

Section 6.7 (3 topics)

- Solving an equation written in factored form
- Finding the roots of a quadratic equation with leading coefficient 1
- Finding the roots of a quadratic equation with leading coefficient greater than 1

Section 6.8 (1 topic)

- Pythagorean Theorem

Chapter 6 Supplementary Topics (1 topic)

- Factoring with repeated use of the difference of squares formula

Chapter 7 - Rational Expressions and Equations (4 topics, no due date)

Section 7.6 (3 topics)

- Solving a linear equation with several occurrences of the variable: Variables on both sides and fractional coefficients
- Solving a linear equation with several occurrences of the variable: Fractional forms with binomial numerators
- Solving for a variable in terms of other variables in a rational equation: Problem type 1

Chapter 7 Supplementary Topics (1 topic)

- Word problem on unit rates associated with ratios of whole numbers: Decimal answers

Chapter 8 - Radicals (25 topics, no due date)

Section 8.1 (5 topics)

- Square root of a perfect square
- Pythagorean Theorem
- Square root of a rational perfect square
- Square root of a perfect square monomial
- Cube root of an integer

Section 8.2 (5 topics)

- Simplifying the square root of a whole number less than 100
- Simplifying a radical expression with an even exponent
- Simplifying a radical expression with two variables
- Simplifying a higher root of a whole number
- Simplifying a higher radical expression: Multivariate

Section 8.3 (2 topics)

- Square root addition or subtraction
- Simplifying a sum or difference of radical expressions: Multivariate

Section 8.4 (3 topics)

- Square root multiplication: Advanced
- Simplifying a product involving square roots using the distributive property: Advanced
- Special products of radical expressions: Conjugates and squaring

Section 8.5 (4 topics)

- Rationalizing a denominator: Quotient involving square roots
- Rationalizing a denominator: Square root of a fraction
- Rationalizing a denominator using conjugates: Integer numerator
- Rationalizing a denominator using conjugates: Square root in numerator

Section 8.7 (4 topics)

- Converting between radical form and exponent form
- Rational exponents: Non-unit fraction exponent with a whole number base
- Rational exponents: Negative exponents and fractional bases
- Rational exponents: Powers of powers with negative exponents

Chapter 8 Supplementary Topics (2 topics)

- Simplifying a product of radical expressions: Multivariate
- Rational exponents: Products and quotients with negative exponents

Chapter 9 - Quadratic Equations, Complex Numbers, and Functions (6 topics, no due date)

Section 9.6 (5 topics)

- Identifying functions from relations
- Vertical line test
- Domain and range from ordered pairs
- Table for a linear function
- Evaluating functions: Linear and quadratic or cubic

Chapter 9 Supplementary Topics (1 topic)

- Finding inputs and outputs of a function from its graph